Wilson Creek - Mankato

Preliminary Findings and Recommendations

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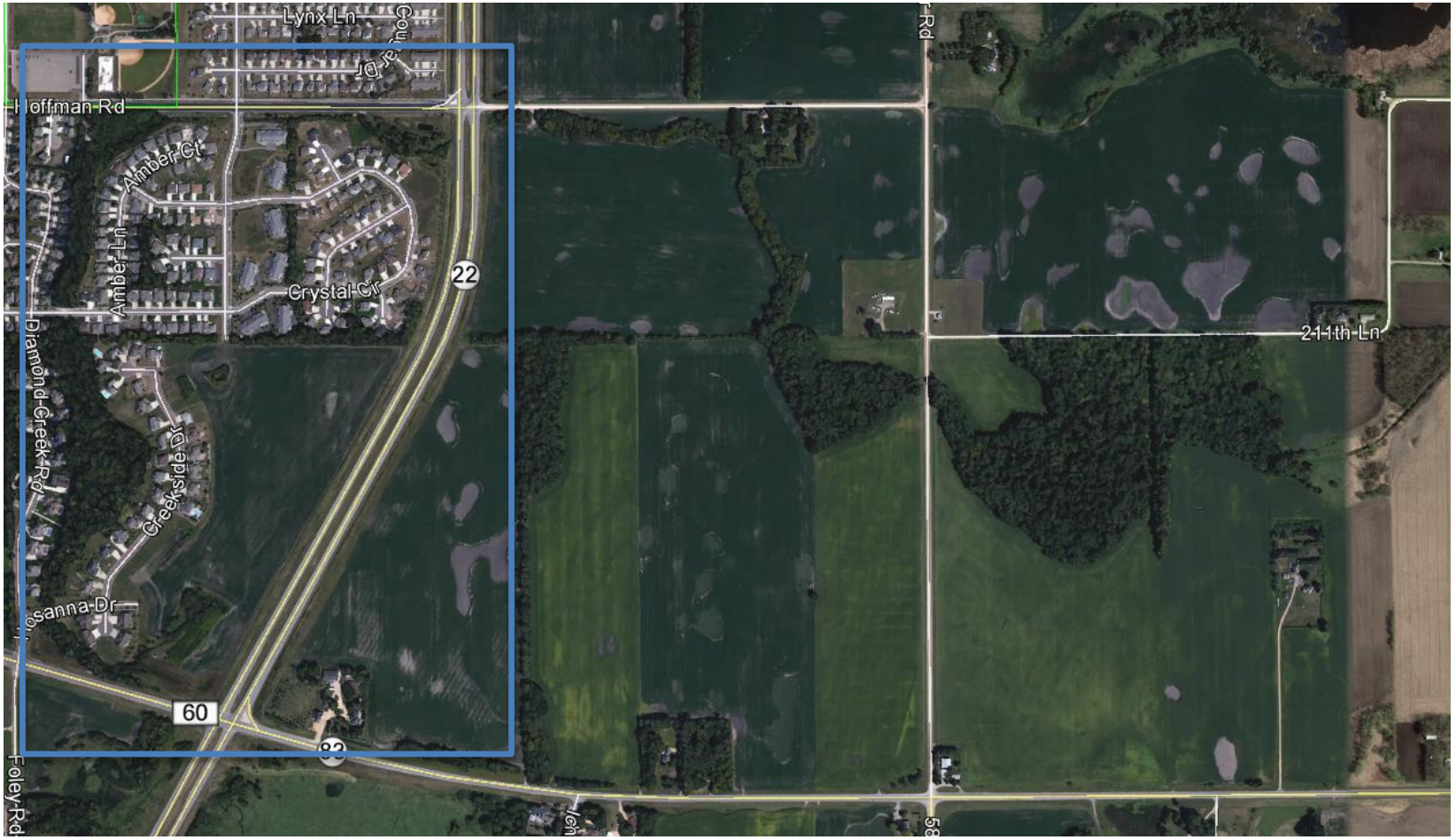
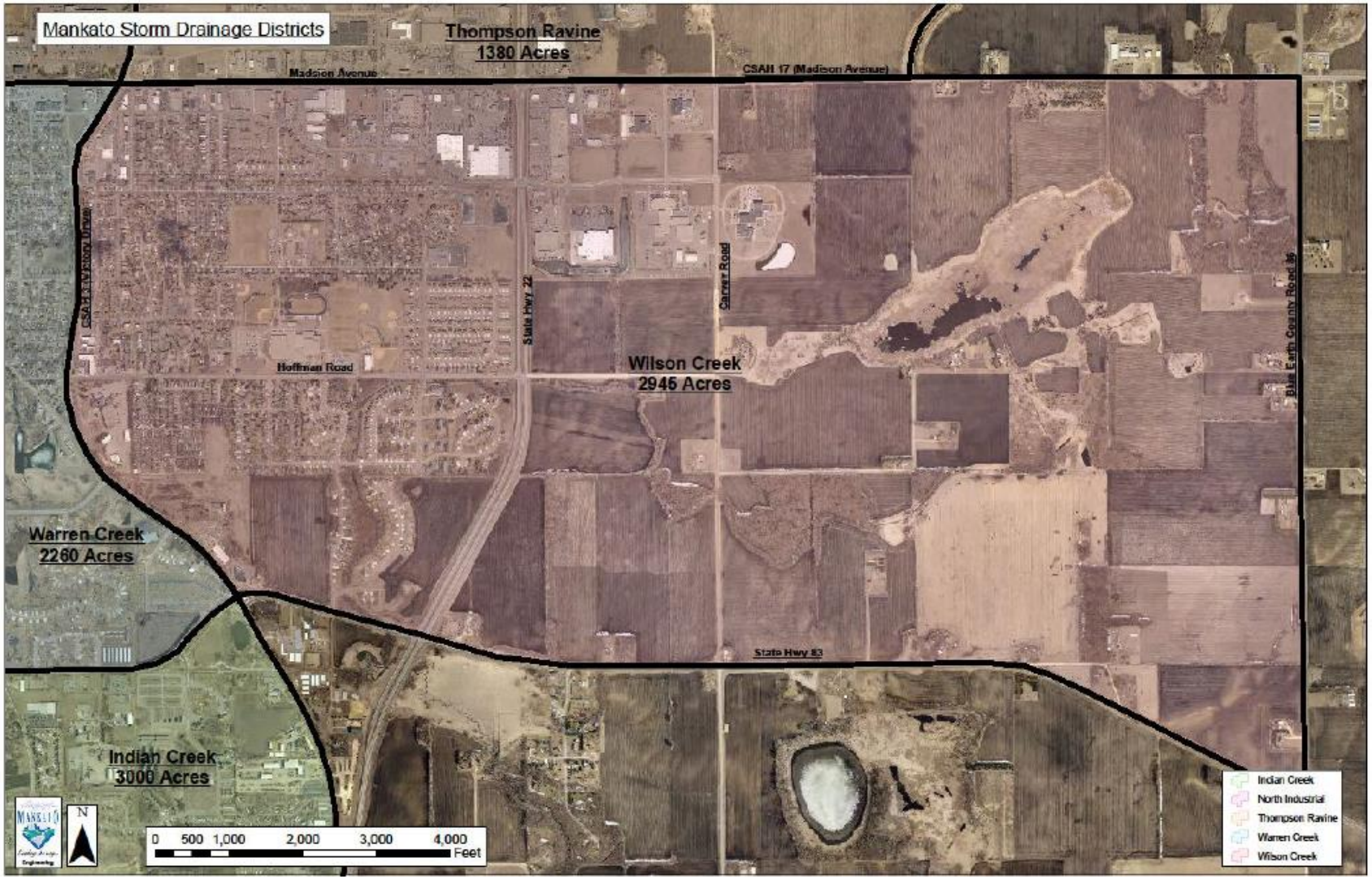
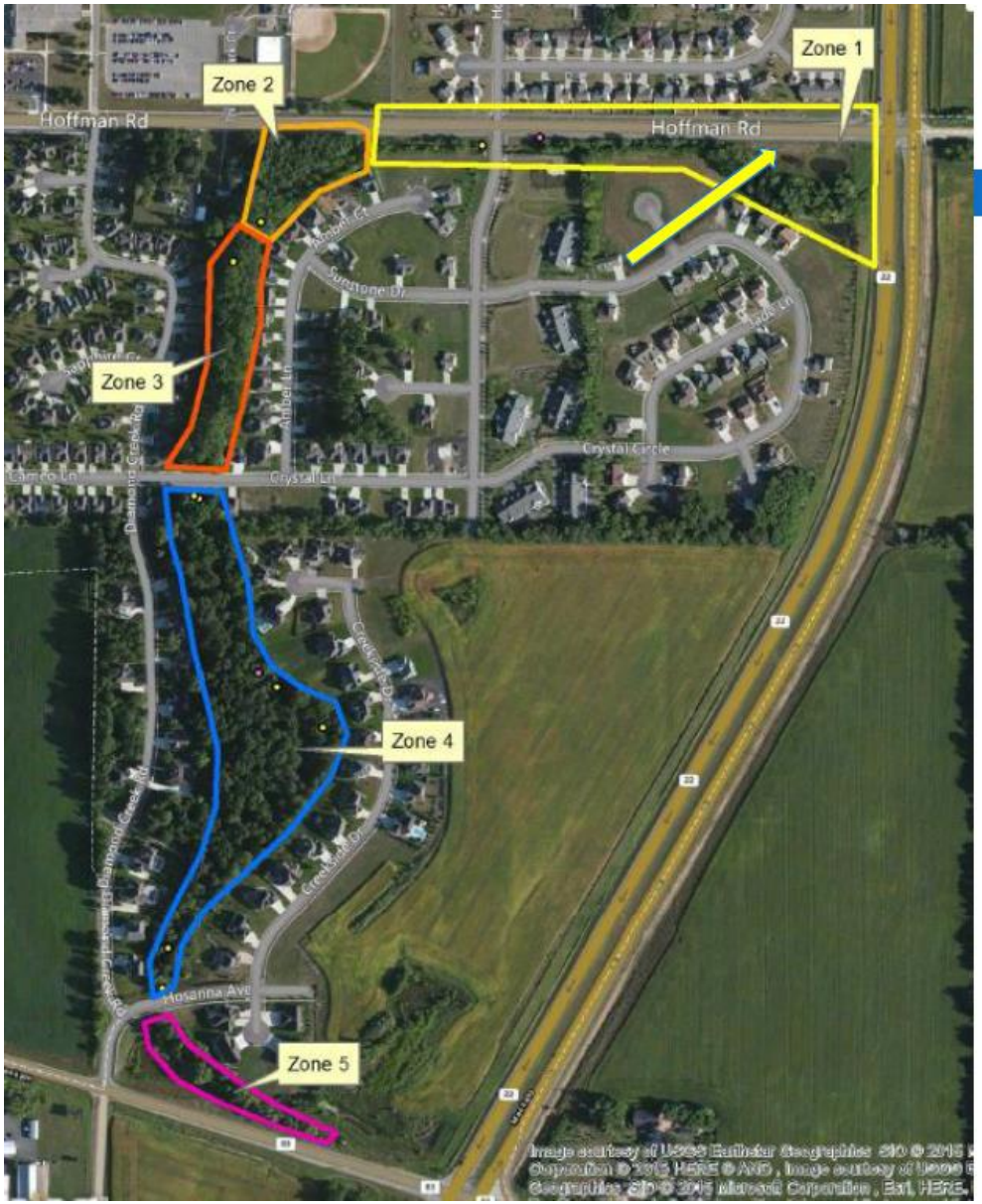
WILSON CREEK GENERAL MAP

STUDY AREA AND UPSTREAM HEADWATERS TO THE EAST



Wilson Creek





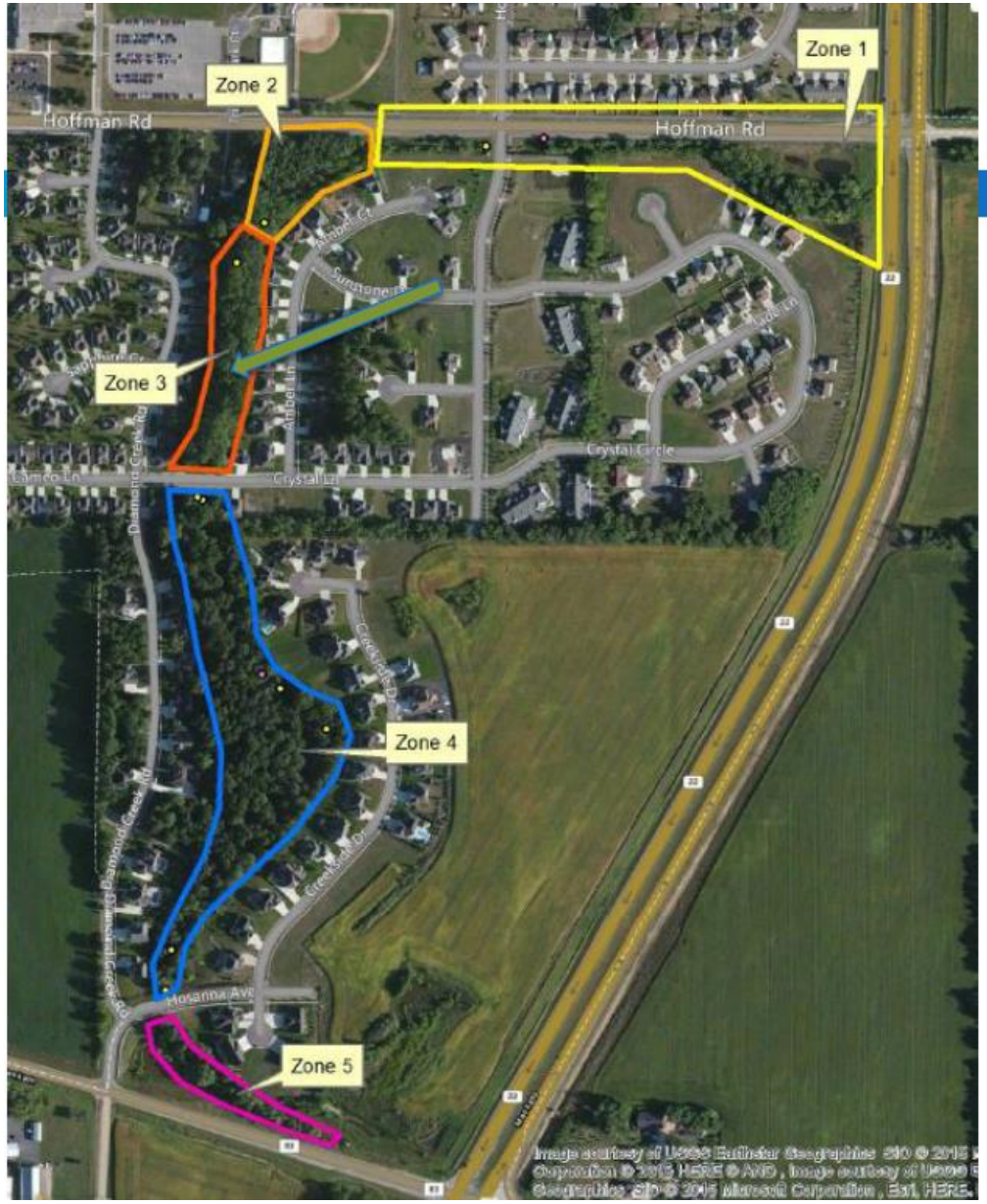
Study Area

- **Zone 1 – Hoffman Rd. Ditch section**
- Zone 2 – Narrow creek with young vegetation
- Zone 3 – Downstream of two 60-inch storm pipes – wider straight channel
- Zone 4a: South of Crystal Lane – relatively straight, limited bank erosion.
- Zone 4b: Most pronounced bank erosion, tight meanders, high banks.
- Zone 4c – Meanders with short banks, sediment bars
- Zone 5 – Hosanna Ave to Hwy 83

Zone 1

- Identified needs:
  - Potential slope failures and sloughing
  - Relatively steep banks, near traveled way
  - High velocities
- Potential improvement
  - Continued vegetation management
  - Flow reduction

Zone 2



Zone 3

- Zone 1 – Hoffman Rd. Ditch section
- Zone 2 – Narrow creek with young vegetation
- **Zone 3 – Downstream of two 60-inch storm pipes – wider straight channel**
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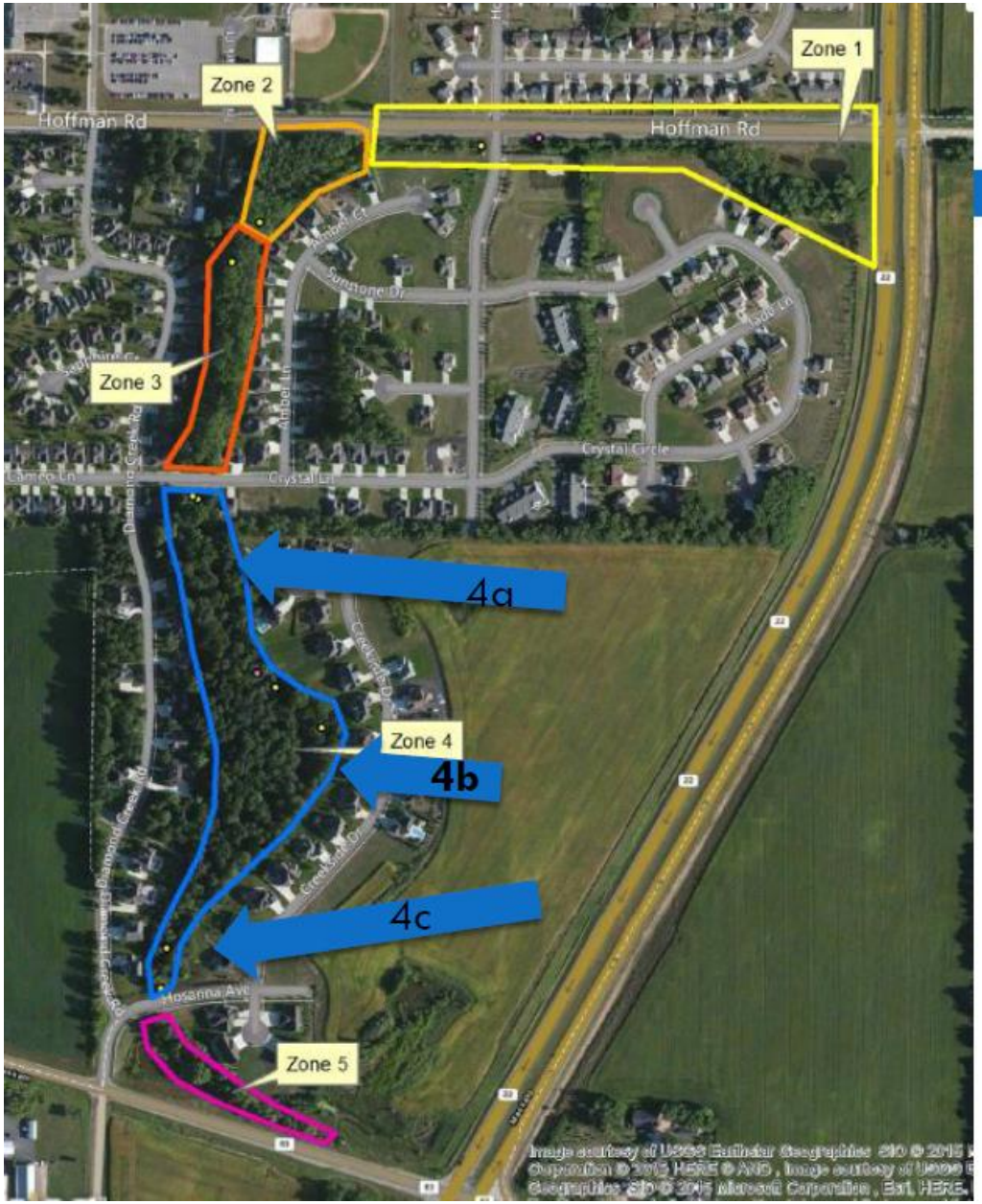
Hoffman Road Culvert Outlets



Zone 4

- Zone 1 – Hoffman Rd. Ditch section
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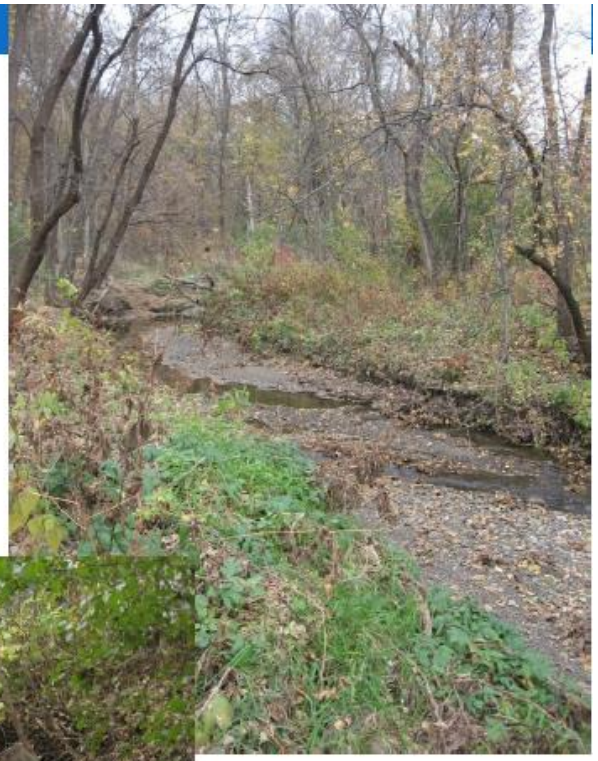
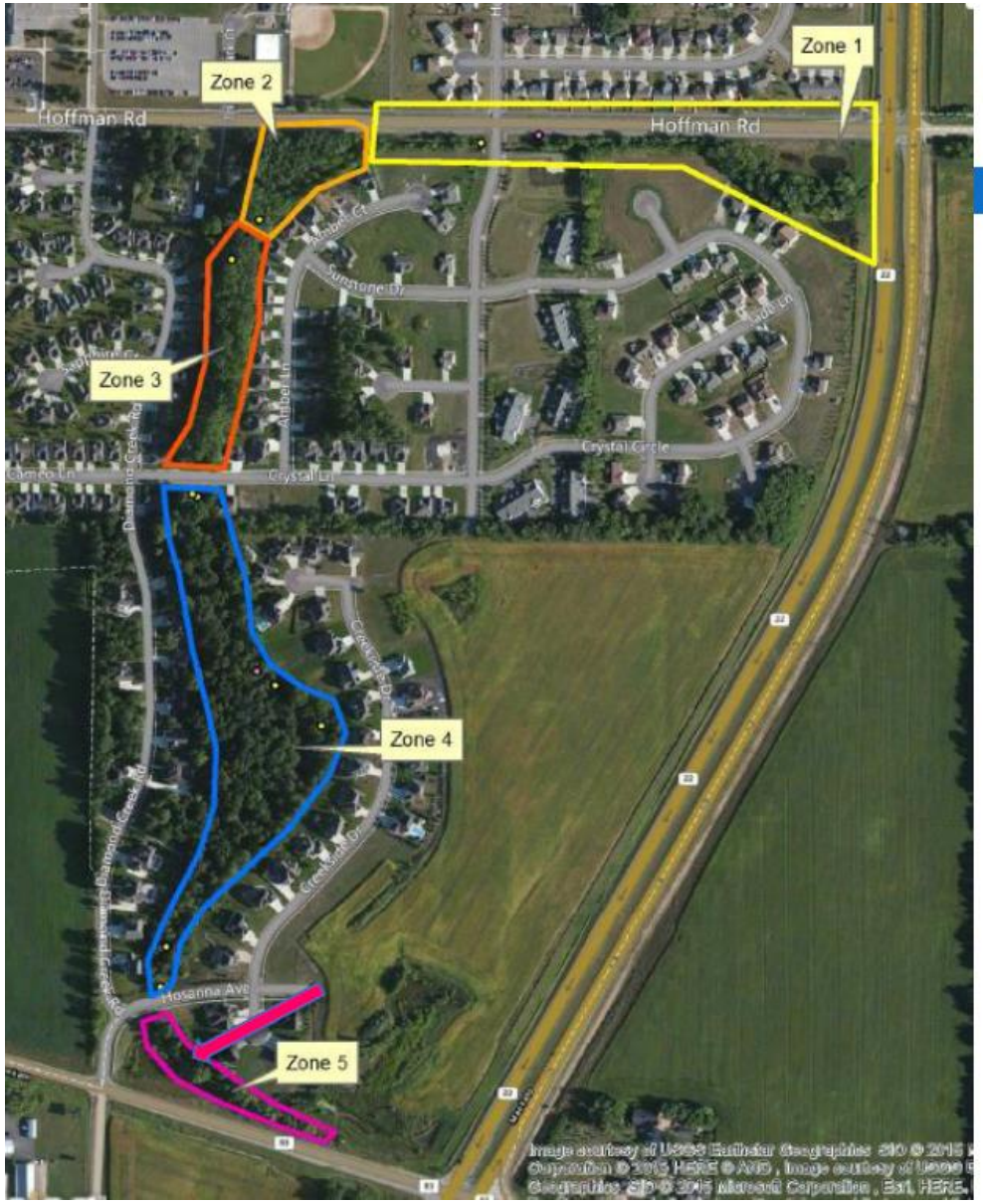
- **Zone 4b: Most pronounced bank erosion, tight meanders, high banks.**
- **Zone 4c – Meanders with short banks, sediment bars**
- Zone 5 – Hosanna Ave to Hwy 83





Zone 5

- Zone 1 – Hoffman Rd. Ditch section
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- Zone 4a: South of Crystal Lane – relatively straight, limited bank erosion.
- Zone 4b: Most pronounced bank erosion, tight meanders, high banks.
- Zone 4c – Meanders with short banks, sediment bars
- **Zone 5 – Hosanna Ave to Hwy 83**

Concerns – Based on Public Comments Received

Erosion

Dead Trees/Wood Debris

Misc. Debris

High Water Levels

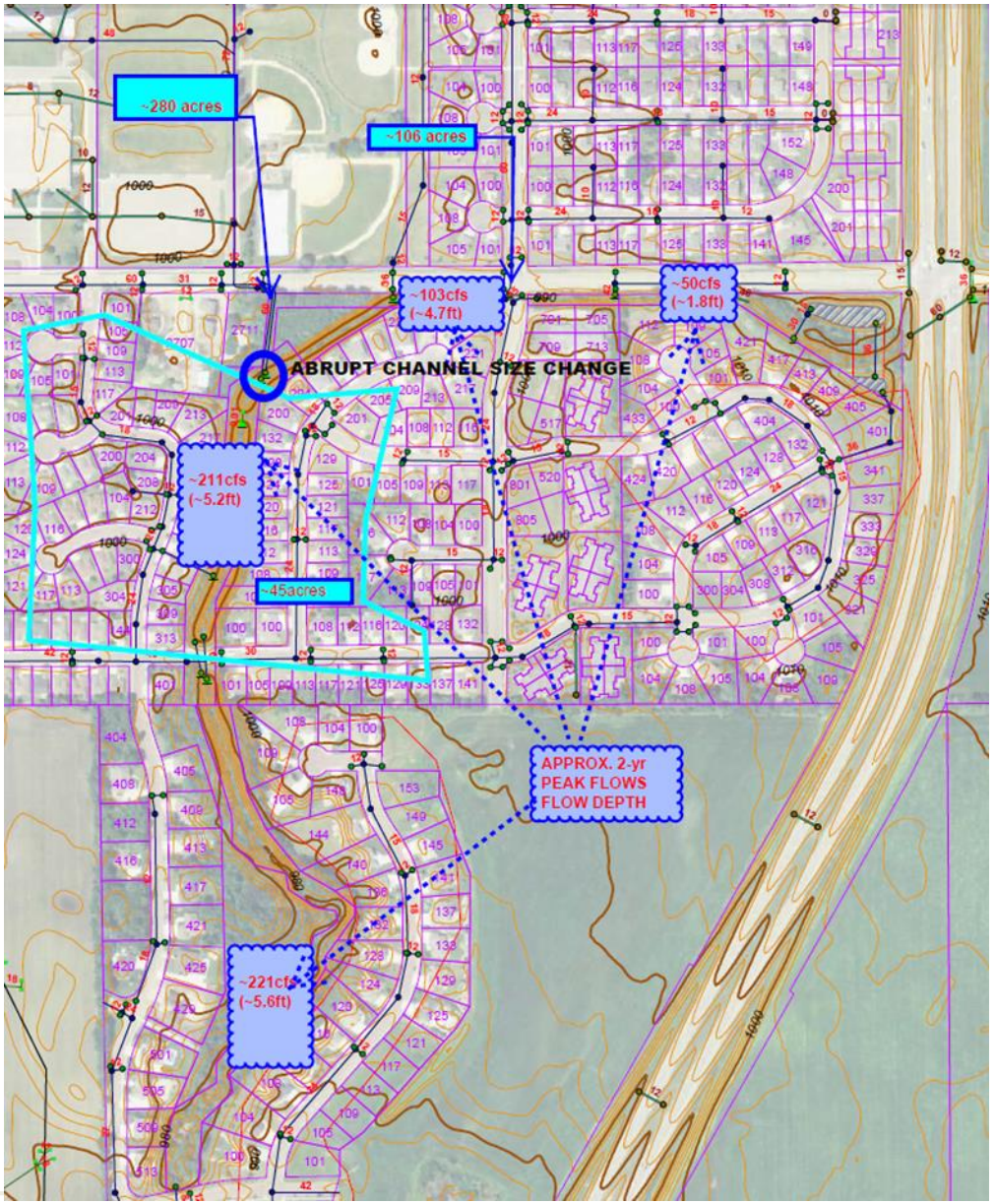
Vegetation management (buckthorn, cottonwoods)

Flooding

None

Findings

- Abrupt Increase in Peak Flows downstream of large Culverts Outlets (Zone 2 to Zone 3 transition)
  - Results in Channel Widening
- Large increase in peak flow due to runoff from the urbanized area north of Hoffman Road
  - Area drained by a dense storm sewer system.



Causes

- Common Issues to Developing Urban Areas
  - Vegetation Decay / Overgrowth
  - Debris and Excess Sediment
  - Stream Widening and Bank Erosion
  - Increased Flood Frequency
- Natural Processes Enhanced by rapid land use changes
  - Bank Erosion due to Channel Migration (active meanders)
  - Wood Debris Accumulation

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Woodside Ln
Creekside Dr
Diamond Creek Rd
Hosanna Dr
Creekside Ct
Image U.S. Geological Survey
Woodside Ln
Creekside Dr
Diamond Creek Rd
Hosanna Dr
Creekside Ct
22

Solutions

Local Scale >>> Reach Scale >>> Creek-Scale

CREEK-WIDE IMPROVEMENTS

Explore Storage Detention & Stormwater Treatment

General Clean-up
(wood debris, excess sediment)

Vegetation Management
(Removal & Re-Planting)

Wetland Creation within creek corridor

STABILIZE BANK EROSION

Reshape Creek Meandering Corridor with gentler meanders, native vegetation narrow floodplain, and short rock dams

Minimal Local Solutions:

Bank Reinforcement (e.g. boulder wall)
and possibly local Flow Diversion

Short Term >>>>>>>>>> Mid Term >>>>>>>>>>>> Long Term

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Short term
Vegetation Management - ideas

- Reduce Overstory Shading
  - promote deep rooted grassy vegetation
- Removal of Invasive Species
- Develop a re-vegetation program to promote a resilient, healthy plant community
- Removal of cut trees from bank's edge (except in cases when they are used for stabilization)

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Policy Recommendations

- Establishment of Meander Corridor and Corridor Management Plan & Policy
  - Promote bank stabilization projects as channel encroaches on Meander Corridor Limits
    - Establish prescribed bank stabilization methods
    - City cost share program
  - Develop Vegetation Management Plan
  - Research Water Quality Funding Opportunity

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Meander Corridor Management Concept

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Mid to Long term Recommendations

- Research Potential for Reach Scale Project to Restabilize and Enhance Creek Functions
  - Gentler meanders within Meander Corridor
  - Resilient Riparian Vegetation
  - Flatter Banks with overbank floodplain
- Investigate Global Peak Flow and Velocity Reduction
  - Regional Ponds, upstream of culvert outlets
  - In-line ponding (rock check dams, culvert inlet modifications)
  - High Flow Meander Cut offs

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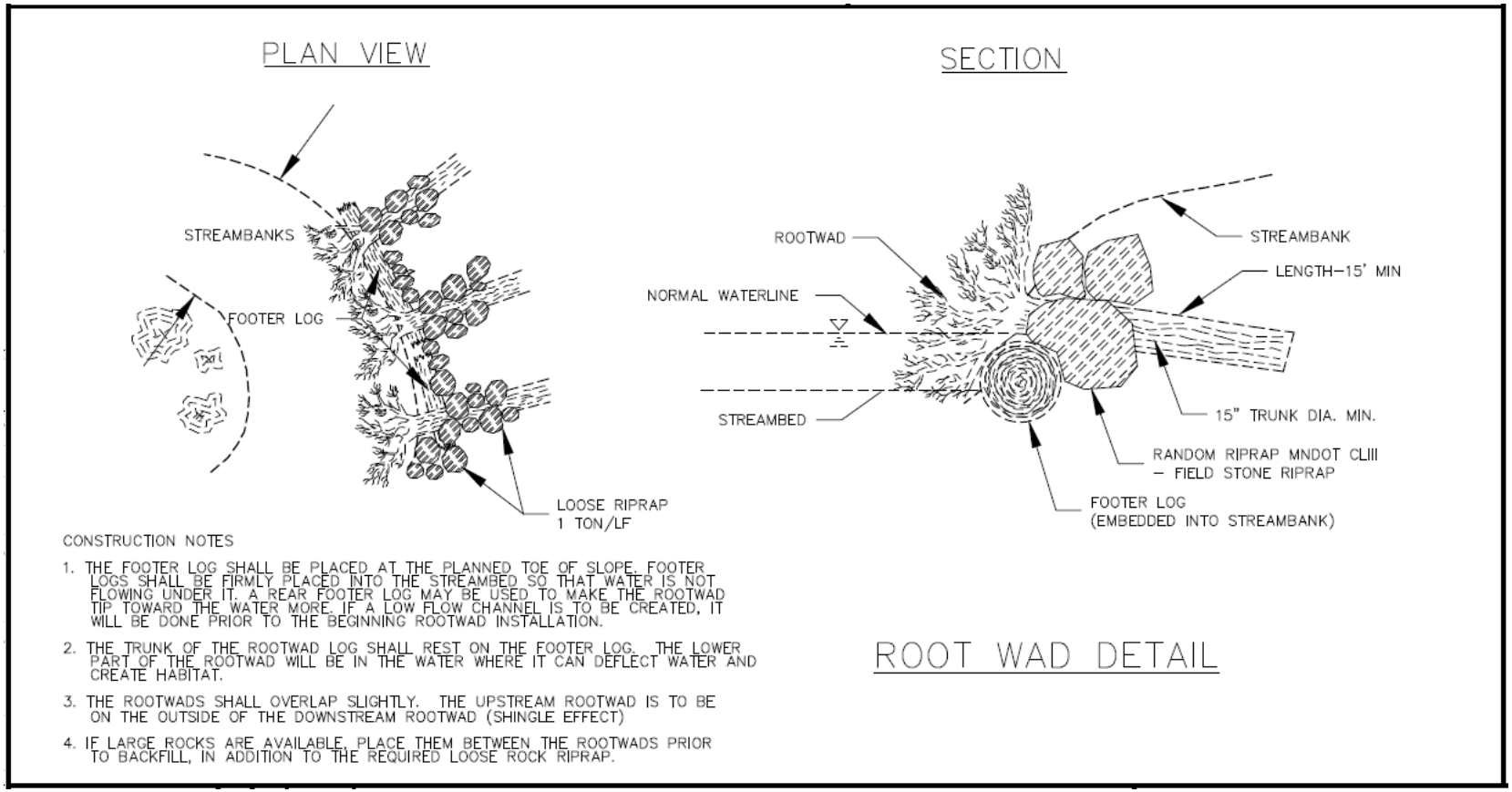
Bank Stabilization Project Examples

Utilization of On-site trees for bank stabilization



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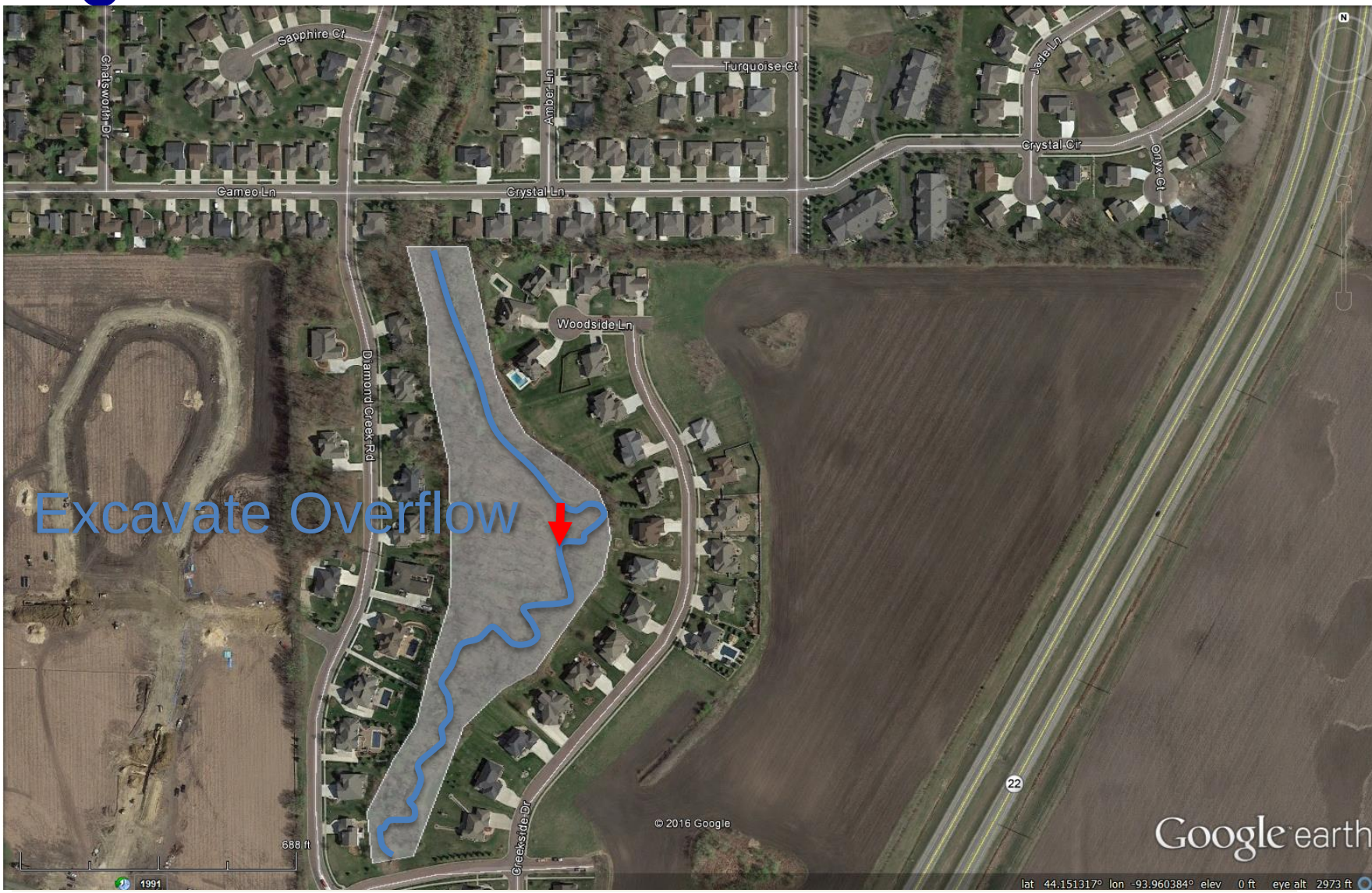
Following Spring


One Year After

High Flow Meander Cutoff



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Reach Scale Project Ideas

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Reach Scale Project Ideas

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Typical Channel Stabilization Costs

- Channel Realignment and Stabilization
  - $400 - $600 per linear foot of channel
  - Total Project cost for Crystal Lane to Hosana Drive is approx. $800,000 to $1,200,000

- Bank Stabilization Alone
  - $250 - $300 per linear foot of channel
  - $28,000 to $33,000 per lot (assuming average of 110 feet of creek frontage)

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Questions?